DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Statement of Basis (SOB)

PERMITTEE: Willow Creek Sewer District #306

PERMIT NO.: MT 0025038

RECEIVING WATER: Borrow Ditch along State Highway 287

FACILITY INFORMATION

Name: Willow Creek Waste Water Treatment Plant

Location:
Facility: 45º 49´ 25˝ N lat, 111º 38´ 51˝ W lon

Contacts: Stephen Nowak, Chairman
(406) 285-3526
P.O. Box 145
Willow Creek, MT 59760

FEE INFORMATION

Number of Outfalls: 1 (For Fee Determination Only)

Type of Outfall: 001 Treated Domestic Wastewater

I. Permit Status

This facility is owned and operated by the Willow Creek Sewer District #306 (District). The District was issued a Montana Pollutant Discharge Elimination System permit (MT0020486) on June 16, 1997 to discharge to an unnamed borrow ditch. The permit expired on January 31, 2002. The permittee submitted fees for renewal of their permit on February 1, 2001. The permit was administratively extended on March 3, 2001.

During an administrative review as part of a compliance inspection, May 6, 2005, it was noted there was no application on file with the Department. The facility was given 30 days to submit an application for the renewal of the MPDES permit. The permittee submitted EPA form 2A on October 5, 2006. A deficiency letter was mailed on December 1, 2005 requesting proper signatory of the application. The Department received the required documentation on December 19, 2005. The application was determined to be complete on February 6, 2006.

The proposed facility is not considered a new or increased source under the Administrative Rules of Montana (ARM) 17.30.702(18). This source is not considered a new discharger or new source under ARM 17.30.1304(36) and (37) respectively.

II. Facility Information

A. Facility Description

The original facility consisted of a collection system, lift station and a mechanical aerated package plant. There has been numerous and substantial operational problems with the package plant that have led to extended compliance violations with the District. The District has decided to upgrade the facility to a three-cell facultative lagoon with ultra-violet (UV) disinfection. The outfall location will remain at the existing location. The upgraded facility will serve approximately 345 people. The design flow of the upgraded facility will be 0.0345 million gallons per day (mgd) or 0.053 cubic feet per second (cfs). Table 1 summarizes the current design criteria for the facility.

The new facility can be operated as either a continuous or an intermitted discharge.

B. Compliance History

The facility has had three violation letters issued for failure to submit DMRs from the period from July 2001 through May 2005. In addition the facility was issued a 617 violation letter (June 2005) resulting from a compliance inspection during May 2005. Areas identified in the 617 letter included: Lack of a current application on file with the Department; Failure to submit DMRs for the period from August 2003 through May 2005; Failure to notify the Department of planned changes to the treatment works; and Failure to monitor pH and total residual chlorine on a daily basis.

Subsequently a 611 violation letter was issued (July 2005) for failure of the facility to return to compliance with the above cited issues. The facility did not respond to the conditions contained in the 611 violation letter and the case was referred to the enforcement division for formal enforcement on September 19, 2005. The enforcement division currently has an active administrative order issued.

Table 1. Current Design Criteria Summary – Willow Creek Lagoon	
Facility Description: Three-cell facultative lagoon system with UV disinfection.	
Construction Date: 2005 Design Year: 1999	Modification Date:
Design Population: 345	Population Served:300
Design Flow Average (mgd) 0.034	Design Flow, Peak (mgd): 0.136
Primary Cells: 2	Secondary Cells: 1
Minimum Detention Time (System) (days): 180	
Design BOD_5 Removal (%): 85	Design Load (lb/day) :
Design SS Removal (%): 85	Design Load (lb/day):
Collection System: separate	
SSO Events (Y/N): No	Number:
Bypass Events (Y/N): No	Number:
Inflow Flow (mgd): 30gpcd	Source: PER 1999
Disinfection: yes	Type: UV
Discharge Method: Continuous or Controlled	
Effluent Flow Primary Device: Inline flow meter	
Recording Device: totalizer	
Sludge Storage: In system	
Sludge Disposal:	EPA Permit:

B. Effluent Characteristics

There is no effluent characterization data available for the new facility. It is expected the effluent quality will achieve the levels attainable at other systems utilizing the same treatment process. The following table lists the expected effluent quality discharging from the Willow Creek facility.

Table 2. Estimated Effluent Characteristics		
Parameter (mg/L unless noted otherwise)	**Maximum Daily Value**	**Average Daily Value**
Flow (mgd)	0.136	0.034
Biological Oxygen Demand (BOD_5)	65	45
Total Suspended Solids (TSS)	100	65
Temperature (winter) (° F)	50	40
Temperature (summer) (° F)	85	75
pH (s.u.)	9.0	7.6
Fecal Coliform (#/100 ml)	400	200
Ammonia	15	5
Nitrate + Nitrite, as N	35	24
Total Phosphorus, as P	10	5

III. Proposed Technology-Based Effluent Limitations (TBEL)

The Board of Environmental Review has adopted by reference 40 CFR 133 which set minimum treatment requirements for secondary treatment or equivalent for publicly owned treatment works (POTW) [ARM 17.30.1209]. Secondary treatment is defined in terms of effluent quality as measured by BOD_5, TSS, percent removal of BOD_5 and TSS, and pH. National secondary treatment requirements are described on 40 CFR 133 and incorporated into all municipal permits.

The Secondary treatment requirement may be modified on a case-by-case basis for facilities that are eligible for treatment equivalent to secondary (TES) treatment [40 CFR 133.101 (g)] for BOD_5, TSS and percent removal. To determine if a facility is eligible for TES the facility must meet the requirements of 40 CFR 133.101(g), summarized as follows:

1) The 95th percentile of the 30-day BOD_5 and TSS concentrations in a minimum 2-year period, excluding upsets, bypasses, operational errors and unusual conditions [40 CFR 133.101(f)] exceed the minimum levels established for secondary treatment requirement;
2) The treatment works utilize a trickling filter or waste stabilization pond; and,
3) The treatment works utilizes biological treatment that consistently achieves a 30-day average of at least 65 percent removal [40 CFR 133.101(k)].

No data is available to determine if the Willow Creek lagoon is eligible for treatment equivalent to secondary (TES) treatment effluent limitations. Upgraded facultative lagoon facilities are expected to meet secondary treatment limitations for BOD_5 and TSS [ARM 17.30.1209(2)].

<u>Technology-Based Effluent Limitations – Basis for Mass-Based Calculations</u>

ARM 17.30.1345(8) requires that all effluent limitations must be expressed in terms of mass. Load (lbs/day) = Design Flow (MGD) x Concentration (mg/L) x Conversion Factor (8.34)

BOD_5: 30-d Load = 0.034 MGD x 30 mg/L x 8.34 = 8.5 lbs/day
7-d Load = 0.034 MGD x 45 mg/L x 8.34 = 12.7 lbs/day
TSS: 30-d Load = 0.034 MGD x 30 mg/L x 8.34 = 8.5 lbs/day
7-d Load = 0.034 MGD x 45 mg/L x 8.34 = 12.7 lbs/day

Table 3. Technology-based Effluent Limitations

Parameter	Concentration		Load		Rationale
	Weekly Average[1] (mg/L)	**Monthly Average** (mg/L)	**Weekly Average Load** (lbs/day)	**Monthly Average Load** (lbs/day)	
BOD_5	45	30	12.7	8.5	40 CFR133.102(a)(1)(2)
TSS	45	30	12.7	8.5	40 CFR 133.102(b)(1)(2)
pH (s.u.)	Within the range of 6.0 to 9.0				40 CFR 133.102 (c)
BOD_5 Removal Efficiency (%)	85 %				40 CFR 133.102(a)(4)(iii)
TSS Removal Efficiency (%)	85 %				40 CFR 133.102(b)(3)

[1] See Part V of the permit for explanation of terms.

Nondegradation

The provisions of ARM 17.30.701, *et seq*. (Nondegradation of Water Quality) apply to new or increased sources of pollution [ARM 17.30.702(18)]. Under ARM 17.30.702 the discharge from the Willow Creek lagoon is considered to be an existing source that will not result in a new or increased discharge because the discharge was approved prior to April 29, 1993. Nondegradation threshold load allocations satisfying the Montana Nondegradation Rules (ARM 17.30 subchapter 7) were calculated in previous permits and will not be re-calculated in this permit.

There are no data available to compare allocated loads to actual loads discharged. Self-monitoring for the applicable parameters will be required in this permit cycle to support such comparisons in the next permit cycle. A summary of the nondegradation threshold load allocations for the Willow Creek lagoon is presented in Table 4. Any increase above this amount is subject to the provisions of the Nondegradation Policy (75-5-303, MCA).

Table 4. Nondegradation Load Allocations	
Parameter	**Allocated Load 30-Day** (lbs/day)
BOD_5	3.8
TSS	3.8
Total Nitrogen, as N	4.2
Total Phosphorus, as P	1.1

IV. Proposed Water Quality-Based Effluent Limitations (WQBEL)

A. Scope and Authority

The Montana Water Quality Act (Act) states that a permit may only be issued if the Department finds that the issuance or continuance of the permit will not result in pollution of any state waters [75-5-401(2), Montana Code Annotated (MCA)]. Montana water quality standards at ARM 17.30.637(2) require that no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. ARM 17.30.1344(1) adopts by reference 40 CFR 122.44 which states that MPDES permits shall include limitations on all pollutants which will cause, or have a reasonable potential to cause an excursion of any water quality standard, including narrative standards. The purpose of this section is to provide a basis and rationale for establishing effluent limitations for the Willow Creek lagoons based on Montana water quality standards that will protect designated uses of the receiving stream.

The Act authorizes the issuance of point source discharge permits on a listed water body pending completion of a TMDL provided that: 1) the discharge is in compliance with the provisions of 75-5-303 (Nondegradation Policy), MCA; 2) the discharge will not cause a decline in water quality for the parameters for which the water body is listed; and, 3) the minimum treatment requirements under 75-5-703(10), MCA are met.

B. Receiving Water

The Willow Creek lagoons discharge to an unnamed borrow ditch along state highway 287. The effluent travels the reach of highway 287 through the town of Three Forks and ultimately may reach the Madison River. At the point of discharge the borrow ditch receives flow only from the facility, therefore the receiving water is effluent dominated.

The water use classification for waters in this area are listed as B-1 [ARM 17.30.610(1)(a)]. Waters classified B-1 are to be maintained suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

The barrow ditch at the point of discharge is not listed as an impaired waterbody on either the 1996 or 2006, Total Maximum Daily Load (TMDL), 303(d) impaired stream list.

C. Mixing Zone

The receiving water is effluent dominated and the 7Q10 is zero; therefore, no instream dilution is available for mixing. A mixing zone will not be granted for this discharge.

D. Applicable Water Quality Standards

Permits are required to include water quality-based effluent limits (WQBELs) when technology-based effluent limits are not adequate to protect water quality standards (40 CFR 122.44, ARM 17.30.1344). ARM 17.30.637(2) requires that no waste may be discharged that either alone or in combination with other waste will violate any applicable water quality standard, including numeric and narrative standards.

Water quality standards applicable to ephemeral drainages are general treatment requirements specified by AMR 17.30.635 and 17.30.637. Specific water quality standards of ARM 17.30.620 through 17.30.629, as stated in ARM 17.30.637(6), do not apply to ephemeral drainages. The discharge must comply with the general prohibitions (narrative standards) of ARM 17.30.637(1) which require that state waters, including mixing zones, must be free from substances which will:

(a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
(b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;
(c) produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
(d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and
(e) create conditions which produce undesirable aquatic life.

In order to comply with the narrative requirements of ARM 17.30.637(1)(d), prohibiting conditions which are harmful to humans, the permit will contain effluent limits based on the state water quality standard for *Escherichia coli*.

Proposed WQBEL Limits:

***Escherichia coli* (*E. coli*) Limits –** The applicable standard for *E. coli* is:

1) April 1 through October 31, of each year, the geometric mean number of the microbial species *E. coli* must not exceed 126 colony forming units (cfu) per 100 milliliters (mL), nor

are 10% of the total samples during any 30-day period to exceed 252 cfu per 100 mL (ARM 17.30.629(2)(a)(i)); and

2) November 1 through March 31, of each year, the mean number of *E. coli* organisms should not exceed 630 cfu per 100 mL and 10% of the samples during any 30-day period may not exceed 1,260 cfu per 100 mL (ARM 17.30.629(2)(a)(ii)).

The previous permit required disinfection for fecal coliform bacteria year around, due to the accessability and location of the discharge point, numeric *E. coli* limitations will continue to be required year around. The facility is utilizing UV disinfection at this time so chlorine limits are not warranted.

V. Final Effluent Limitations

Effluent Limitations: Outfall 001				
Parameter	**Units**	**Average Monthly [1]**	**Average Weekly [1]**	**Maximum Daily [1]**
Biological Oxygen Demand (BOD_5)	mg/L	30	45	--
	lbs/day	8.5	12.7	--
Total Suspended Solids (TSS)	mg/L	30	45	--
	lbs/day	8.5	12.7	--
E. coli – Summer [2, 3]	CFU/100-mL	126	--	252
E. coli – Winter [2, 3]	CFU/100-mL	630	--	1,260

Footnotes:
1. See Definition section, Part V of MPDES permit, for explanation of terms.
2. Summer is defined as April 1 through October 31; winter is defined as November 1 through March 31.
3. Report Geometric Mean if more than one sample is collected in the reporting period.

Effluent pH shall remain between 6.0 and 9.0 unless a variation is due to natural biological processes. For compliance purposes, any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.

85 Percent (%) Removal Requirement for BOD_5:
The arithmetic mean of the BOD_5 for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on BOD_5.

85 Percent (%) Removal Requirement for TSS:

The arithmetic mean of the TSS for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on TSS.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge which causes visible oil sheen in the receiving stream.

V. Monitoring Requirements

A. Outfall 001

Monitoring requirements in the permit are based on the type of treatment facility and the method of discharge (e.g. controlled). The permittee will monitor effluent quality at the new effluent discharge lift station. Influent samples will be collected from the new influent control structure. Influent samples are required every month, including when the facility is not discharging.

Monitoring Requirements				
Parameter	**Unit**	**Sample Location**	**Sample Frequency**	**Sample Type [1]**
Flow	mgd	Influent	---	[2]
	mgd	Effluent	3/Week	Instantaneous
Flow, Duration of Event	days	Effluent	NA	Calculated
5-Day Biological Oxygen Demand (BOD_5)	mg/L	Influent [3]	1/Month	Composite
	mg/L	Effluent	1/Week	Composite
	% Removal [4]	NA	1/Month	Calculated
	lbs/day	Effluent	1/Month	Calculated
Total Suspended Solids (TSS)	mg/L	Influent [3]	1/Month	Composite
	mg/L	Effluent	1/Week	Composite
	% Removal [4]	NA	1/Month	Calculated
	lbs/day	Effluent	1/Month	Calculated
pH	s.u.	Effluent	1/Week	Instantaneous
Temperature	°C	Effluent	1/Week	Instantaneous
E. coli	No./100ml	Effluent	1/Week	Grab
Oil and Grease [4]	mg/L	Effluent	1/Quarter	Grab
Total Ammonia, as N	mg/L	Effluent	1/Quarter	Grab
Nitrate + Nitrite, as N	mg/L	Effluent	1/Quarter	Grab
Total Kjeldahl Nitrogen, as N	mg/L	Effluent	1/Quarter	Grab
Total Nitrogen, as N [5]	mg/L	NA	1/Quarter	Calculated
	lbs/day	NA	1/Quarter	Calculated
Total Phosphorus, as P	mg/L	Effluent	1/Quarter	Grab
	lbs/day	NA	1/Quarter	Calculated
Total Dissolved Solids (TDS)	mg/L	Effluent	1/Quarter	Grab
Dissolved Oxygen	mg/L	Effluent	1/Quarter	Grab

Footnotes:

1. See Definitions, Part V. of MPDES permit, for explanation of terms.

2. See Part I.D. Special Conditions of MPDES permit.

3. Influent BOD and TSS samples shall be collected at the specified frequency even if no effluent discharge occurs in the monitoring period.

4. Use EPA Method 1664, Revision A: N-Hexane Extractable Material (HEM), or equivalent. Required only when a oil sheen is visible.

5 Calculated as the sum of Nitrate + Nitrite (as N) and Total Kjeldahl Nitrogen (as N) concentrations.

B. Additional Reporting Requirements

Load and percent removal calculations are required. Standard language with examples of load calculations and percent removal calculations will be included in the permit.

VII . Special conditions

No special conditions are required at this time.

VIII. Other Information

On September 21, 2000, a U.S. District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment (WQLS), the State is not to issue any new or increased permits under the MPDES program. The order was issued in the lawsuit Friends of the Wild Swan v. U.S. EPA, et al. (CV 97-35-M-DWM), District of Montana and Missoula Division.

The DEQ finds that renewal of this permit does not conflict with Judge Molloy's Order (CV 97-35-M-DVM) because: 1) it is not a new permit; 2) the actual load for $BOD_{5,}$ TSS, nitrogen and phosphorus will not exceed the allocated load and the permit is in compliance with the provisions of 75-5-303 MCA.

IX. Information Sources

ARM Title 17, Chapter 30, Subchapter 5 - Mixing Zones in Surface and Ground Water**.** November 2004.

ARM Title 17, Chapter 30, Subchapter 6 - Surface Water Quality Standards. March 31, 2006.

ARM Title 17, Chapter 30, Subchapter 7 - Nondegradation of Water Quality. June 30, 2004.

ARM Title 17, Chapter 30, Subchapter 13 - Montana Pollutant Discharge Elimination System (MPDES) Standards. March 31, 2003.

40 CFR, Parts 122, 133, 136, July 1, 2004.

DEQ. Circular DEQ 2, Design Standards for Wastewater Facilities. 1999.

DEQ. Circular WQB-7, Montana Numeric Water Quality Standards. February 2006.

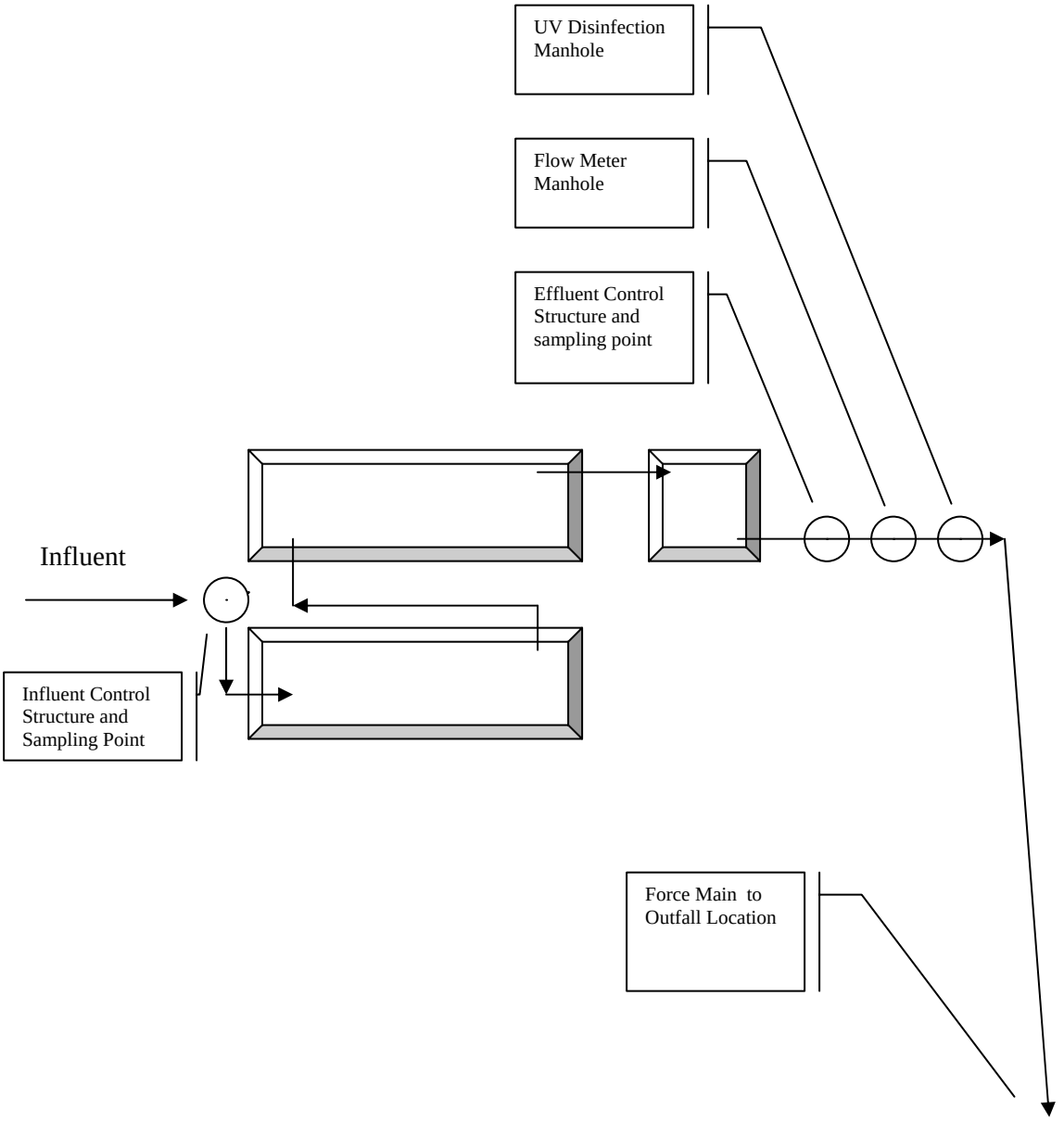
DEQ. Montana List of Water bodies in Need of Total Maximum Daily Load Development. 1996.

DEQ. Montana 303(d) List. A Compilation of Impaired and Threatened Water bodies in Need of Water Quality Restoration. Part A. Water Quality Assessment Results. November 24, 2004.

EPA. Office of Water, U.S. EPA NPDES Permit Writers' Manual, EPA-833-B-96-003. December 1996.

Prepared by: James Lloyd
Date: November 16, 2006

Figure 1


UV Disinfection Manhole
Flow Meter Manhole
Effluent Control Structure and sampling point
Influent
Influent Control Structure and Sampling Point
Force Main to Outfall Location